



## Localized ridge augmentation using mandibular donor sites

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### Purpose

The placement of endosseous dental implants for prosthetic support requires adequate bone volume at the desired location. Defect morphology is an important consideration in selecting a method for ridge augmentation. Autologous bone grafts are the gold standard in repair of alveolar atrophy and bone defects. Although iliac crest is used most often in major jaw reconstruction for implants, block grafts from the mandible have been used with favorable results for repair of smaller defects. Block grafts may be harvested from the mandibular symphysis, body or ramus area. This update describes surgical techniques for augmenting localized buccal-lingual ridge defects using mandibular symphysis donor sites.

### Techniques

Clinical and radiographic examinations are performed to evaluate the donor graft site. For a symphysis harvest, a panoramic radiograph is used to locate the inferior alveolar canal, and the mental foramina. Lateral cephalometric or posterior/anterior projections can be used to evaluate the bone profile of the chin. A periapical radiograph from # 22-27 is used to determine the mesial/distal dimension of the donor site (1). A surgical template is helpful because it enables the surgeon to visualize the final position of the grafted bone.

**Surgical technique:** IV sedation is recommended for patients undergoing this procedure. Inferior alveolar nerve blocks with 2% lidocaine and 1:100,000 epinephrine and 0.5% bupivacaine and 1:200,000 epinephrine are used for local anesthesia in the donor site. If the recipient site is in the maxilla, local infiltration with 2% lidocaine with 1:100,000 epinephrine is used. At the recipient site, an incision is made slightly lingual to the crest of the ridge with divergent releasing incisions leaving a collar of tissue for the

future papillae (space permitting). A full thickness flap is reflected to evaluate the bone defect at the recipient site. A surgical template may be constructed using the bony defect at the recipient site to determine the size and shape of the required autogenous block. A moist gauze is placed over the recipient site while preparation is made to harvest bone from the donor site.

To access the symphysis, a vestibular approach is used (1,2). A partial thickness incision is made in the alveolar mucosa. The coronal aspect of the incision starts 3-4mm apical to the mucogingival junction and usually extends mesially-distally from teeth #21 to #28. Initially, a partial thickness incision is performed to expose intact muscle fibers required for a layered closure of the donor site. Once 4-5mm of muscle fibers are exposed, a full thickness incision is made to expose the symphysis. The mental foramina are located (1,2). To maintain integrity of the neurovascular bundle, of the anterior teeth, the superior aspect of the osteotomy must be at least 5mm apical to the apices of the teeth. In addition, the integrity of the inferior border of the mandible should not be violated. Using the previously constructed template, the dimensions of the donor blocks can be outlined using a #779 bur with copious irrigation (1,2). (Please refer to Misch's article (2) for an illustration.) To ensure adequate buccal-lingual thickness of the blocks and to facilitate harvesting, the buccal lingual depth of the osteotomy extends completely through the cortical bone. A depth gauge or periodontal probe may be used to determine adequate buccal lingual thickness of the block. After the initial osteotomy cuts are completed, an external bevel is placed to facilitate chisel placement and harvest. Prior to removing the block, one or two pilot holes are drilled for future placement of bone stabilization screws. A bone chisel and mallet are used to gently tap along the osteotomy to remove the graft. Forceful tapping should be avoided since fracture of the graft may occur. When

performing the osteotomy, a sterile bone filter may be used to collect autologous bone particles for later use over the recipient site. The block graft is temporarily stored in sterile saline while the donor site is closed. Particulate bone grafting material, ie., autologous, freeze dried bone allograft (FDBA) or Bio-Oss, and a collagen membrane are placed over the donor site. The muscle layers are sutured together using 4-0 Vicryl then interrupted expanded polytetrafluoroethylene (e-PTFE) sutures are used to achieve complete closure of the mucosa. Direct pressure is applied for 3-5 minutes to aid in tissue adaptation and control hemostasis. A pressure dressing is placed over the chin to help support the donor site and minimize edema.

The autogenous donor block is adapted to fit as closely as possible into the recipient site (1). Keep the graft submerged in sterile saline while trimming to minimize dessication and overheating. Osteoplasty of the recipient site may also be necessary for graft adaptation. Intramarrow penetration is performed in the recipient site using a small round bur. Fixate the block to the recipient site using bone stabilization screws placed into the previously drilled pilot holes. Countersinking the fixation screw will minimize the risk of the head of the stabilization screw perforating the soft tissue and will serve as a reference point to determine graft resorption. Once the block graft is secured, voids between the block and recipient site are filled with autogenous bone, alloplastic material or a combination (1,2). Most clinicians will use either a bioabsorbable or non-resorbable membrane to cover the block graft. Complete tension-free soft tissue coverage of the block graft is essential for success. A chin dressing is placed externally over the donor site to maintain hemostasis by direct pressure (1,2).

The patient is given the following post-op medications (1,2):

Amoxicillin 500mg TID for 10 days or  
Cleocin 300mg tid if PCN allergy

Medrol dose pack (comes with a 5-day supply)

Ibuprofen 800mg TID

Narcotic of choice such as Percocet for discomfort not controlled by NSAID

Peridex mouthrinse BID for 10-14 days

The patient is followed up in 24 to 48 hours. The chin dressing is removed in 3-4 days. Stage one implant surgery is planned 4-6 months post-grafting in the maxilla and 5-6 months post-grafting in the mandible (2). Post-op complications usually encountered during the healing phase include nerve paresthesia, infection, wound dehiscence, or altered sensation of the teeth proximal to the donor site (1,2).

Conclusions:

Autogenous block grafts from the mandible offer a good source of bone for alveolar reconstruction prior to implant placement. The advantages are accessibility, minimal resorption, healed bone quality of type 1 or 2, and predictable gain in bone volume.

References:

1. Misch CM, Misch CE, Resnik R, Ismail YH. Reconstruction of maxillary alveolar defects with mandibular symphysis grafts for dental implants: a preliminary procedural report. *Int J Oral Maxillofac Implants* 1992;7(3):360-6.
2. Misch CM. Comparison of intraoral donor sites for onlay grafting prior to implant placement. *Int J Oral Maxillofac Implants* 1997;12(6):767-76.